

Abstract of the Disclosure

This invention discloses a method and apparatus where a pre-treatment which reduce interfacial level density is carried out before thin film deposition on a substrate utilizing a catalytic gas phase reaction. The catalytic gas phase reaction is generated with a treatment gas which is supplied with the substrate via a thermal catalysis body provided near the substrate surface. Thin film deposition on the substrate surface is carried out after this pre-treatment. The thermal catalysis body is made of tungsten, molybdenum, tantalum, titanium or vanadium, and is heated by a heater. And, this invention also discloses a semiconductor device having a semiconductor-insulator junction with its interfacial level density is $10^{12} \text{ eV}^{-1} \text{ cm}^{-2}$ or less, which is brought by the above pre-treatment in the insulator film deposition process.